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In 1940, USSR agriculture had 10,825 electric power installations with a total installed capacity of 275,000 kilowatts, including 700 hydroelectric power stations with a total capacity of 35,000 kilowatts. Agriculture consumed 425 million kilowatt-hours of electric power, 48 percent of which went to kolkhozes. At that time 10,000 kolkhozes and 2,500 MTS were electrified. However, there were still very few completely electrified agricultural regions.

At the beginning of 1946, the total installed capacity of all rural electric power installations was 269,700 kilowatts; in 1950, installed capacity exceeded one million kilowatts. By the beginning of 1951, the installed capacity of rural electric power stations was 2.8 times the prewar level, and the capacity of all rural electric power installations was 3.6 times the prewar level. At the end of 1945, there were 7,942 electrified kolkhozes; on 1 January 1950, there were 28,900. At the end of 1945 there were 3,283 electrified MTS (or 44 percent of all MTS), and on 1 January 1950 there were 7,500 (or 90 percent of all MTS). Between 1945 and 1950, annual electric power consumption in agriculture increased from 375 million to 1.5 billion kilowatt-hours.

At present, kolkhoz electric power stations are being built with the active support and aid of the Soviet state (plans, technical aid, equipment, and special credits in the amount of 75 percent of all financial expenditures).

However, it should be kept in mind that small kolkhoz stations cannot play a vital role in the electrification of agricultural production. Successful solution of the new tasks in the electrification of agriculture demands a change from the former situation, where the growth of rural electrification was basically a matter for the kolkhozes themselves.

The overwhelming majority of kolkhoz electric power stations are small installations with a capacity of 15-25 kilowatts. At the beginning of 1952, the average capacity of kolkhoz electric power stations had reached only 27 kilowatts, and of interkolkhoz electric power stations, 96 kilowatts. For some kolkhozes the cost of construction of a large electric power station is prohibitive. What it comes down to is that large sums are invested in rural electric power construction and the returns are negligible.

The cost of one kilowatt of installed capacity for a 500-kilowatt rural hydroelectric power station is, on the average, about half as much as for a 100-kilowatt station and one third as much as for a 20-kilowatt station. Approximately the same ratio applies with respect to thermal electric power stations. Fuel consumption per kilowatt-hour of electric power in small rural thermal electric power stations is usually several times higher than in large state rural electric power stations. In large electric power stations the net cost of a kilowatt-hour of electric power is measured in kopecks, while in the small ones it is almost a ruble or more. Production of electric power in small kolkhoz electric power stations is often unprofitable and their efficiency is very low.

Electrification of kolkhoz production must, and will, be based not on small kolkhoz electric power stations but mainly on large state power systems and on large rural state and interkolkhoz electric power stations.

From the viewpoints of both economy and technology, extensive and rational use of electric power in socialist agriculture is possible only on the basis of large electric power stations designed to supply power to diverse consumers. It has been calculated that in using electric power from large stations for agriculture it would be possible to increase output without raising the capacity of the stations; this can be done by staggering the consumption schedules. The 1953 state budget for the USSR provides for an expansion in the volume of work on electrification of socialist agriculture -- not only the construction of new rural electric power stations but also the connecting of MTS, kolkhozes, and

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sovkhozes to state power systems. In the large state electric power stations 4,000-5,000 kilowatt-hours of electric power per year are produced for each kilowatt of installed capacity; this is approximately four times more than in small kolkhoz electric power stations.

At the same time, it must be noted that existing electric power generators in agriculture are not fully utilized. The September Plenum of the Central Committee pointed out the need for utilizing the reserve capacity of existing electric power installations. The fact is that the coefficient for utilization of the capacities of rural electric power stations is extremely low; in the majority of cases the output per kilowatt of installed capacity is only about 1,000-2,000 kilowatt-hours of electric power a year. In 1950, for example, all rural electric power installations, with a total capacity of one million kilowatts, produced about 1.5 billion kilowatt-hours. If the substations which get current from the large state electric power stations and the larger rural electric power stations are excluded from this total capacity, then the bulk of rural electric power stations are in use about 1,000 hours a year.

In other words, only 10-20 percent of the installed capacity of rural electric power stations is actually being utilized. By introducing a number of technical and organizational measures it is possible to double the coefficient of utilization for rural electric power stations.

Completion of the immense hydroelectric power stations will open vast opportunities for electrification of agricultural production -- for the introduction of electric plowing and the use of electric combines and other electrically operated agricultural machinery. The 19th Party Congress indicated that introduction of electric tractors and agricultural machines operating on electric power, especially in the regions of the large hydroelectric power stations, is one of the major tasks.

In 1953, USSR electric power stations will produce 133 billion kilowatt-hours of electric power -- 28 times more than in 1940. By the end of the Fifth Five-Year Plan, the total capacity of electric power stations will double and the capacity of hydroelectric power stations will triple. The state will build in this 5-year period not only tremendous hydroelectric power stations of the Kuybyshev type, with an effective radius of 1,000 kilometers, but also rural electric power stations with a capacity of 1,000-2,000 kilowatts each. Construction of regional, industrial, municipal, and rural state electric power stations will provide a secure base for further growth in the electrification of agricultural production. Year by year, an increasing number of kolkhozes, sovkhozes, and MTS will be connected to the transmission lines of state electric power stations.

At this time, when the USSR is launched on a program of extensive electrification of kolkhoz production, the electric power station will be a decisive tool in agricultural production. And such tools should, of course, be concentrated not in the hands of separate kolkhozes but in the hands of the state.

#### CONSTRUCTION OF RURAL ELECTRIC POWER INSTALLATIONS -- Moscow, Izvestiya, 6 Oct 53

This year, 42 state and 400 interkolkhoz hydroelectric power stations with a total capacity of about 65,000 kilowatts will go into service. Many of them, such as the Orlovskaya GES and the Novo-Troitskaya GES in Stavropol'sk y Kray, and the Chernyatskaya GES in Vinnitskaya Oblast, have automatic controls.

This year also, 258 rural thermal electric power stations operating on peat, lignite, and shale will go into operation. However, because enterprises of the Ministry of Transport and Heavy Machine Building USSR are gradually organizing production of steam turbine units of the required capacities, there is a gradual decline in the extensive use of local fuel for purposes of electrification.

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Glavsel'elektro, together with the State Institute for Planning Rural Electric Power Stations and a number of scientific research institutions of industry and agriculture, is working out plans for the electrification of agriculture. These organizations will consider all the sources and consumers of electric power in kolkhozes, sovkhoses, and MTS.

In order that agriculture may avail itself of industrial power systems, many step-down substations, which will provide current for livestock farms, hot-houses, and repair shops of sovkhoses and MTS, will be built in the next few years. To supply them with power, thousands of kilometers of electric power transmission lines will be extended.

By hooking up with the systems of the large electric power stations which are already in operation, e.g., Volkhovskaya, Svirskaia, Tsimlyanskaya, Dneprovskaya, and others, the country's agriculture will consume twice as much electric power in 1955 as at present.

The harnessing of the power of small rivers will continue. This will be done by constructing larger state and interkolkhoz hydroelectric power stations with a capacity of from 1,000 to 10,000 kilowatts.

#### CRITICISMS OF RURAL ELECTRIFICATION -- Moscow, Pravda, 25 Sep 53

There are still gross shortcomings in rural electrification. Neither the tempo of its growth, nor the quality of construction and installation activities; nor the time required to put the stations and networks which have been built into effective use can be considered satisfactory. Plans for the development of rural electrification are not fulfilled. In many cases electric power stations and electric power lines are built as separate, isolated projects without regard for the future growth of electrification in the region as a whole. This frequently leads to amateurish methods, and to inferior quality of planning and building. As a result, it takes a long time to build the stations and networks, they are costly affairs, and sometimes they are not very effective or do not even operate. A large amount of equipment is utilized poorly or is not used because it is incomplete and because there is no technical help available.

Departmentalization of electric power in rural areas is detrimental to rural electrification. It is not surprising that in supplying power for sugar plants, distilleries, and certain other plants located in rural areas and built even before the Revolution the needs of immediate neighbors were not taken into account. But it is absolutely unthinkable that the new electric power stations of industrial enterprises in rural areas and the municipal electric power stations of small cities should be planned and built with no consideration for electrification of the adjacent rural areas.

There are many inadequacies in the training of personnel, especially technicians and rural electric repairmen. There is a lack of active measures to raise the skills of specialists working in the field of rural electrification in some places. Despite the acute shortage of engineers, many young specialists who graduate from faculties of agricultural electrification turn to other work.

The decree of the September Plenum of the Central Committee, CPSU, provides for development of rural electrification. As the decree notes, expansion of agricultural electrification must be accomplished by better utilization of existing rural electric power stations; by connecting MTS, kolkhozes, and sovkhoses to industrial power systems; by constructing new rural electric power stations and wind-driven installations; and by urging construction and industrial ministries and departments to build stations and networks.

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A more definite shift from construction of small, separate electric power stations to construction of electric power stations which have larger capacities and are connected with local power systems is called for. Such stations will be able to electrify one or more administrative rayons. Extensive construction can be better guaranteed by skilled planning, mechanized methods, and permanent personnel.

Soviet science is faced with the job of developing economical thermal power units which operate on local types of fuel and have a capacity of 2,000-3,000 kilowatts. Among these there must be special installations which operate on peat and small steam-heating units for supplying steam heat to large kolkhozes, sovkhozes, and hothouses. It is time to shift to construction of more powerful wind-driven electric power stations and groups of wind-driven electric power stations in order to put the wind power of the steppe regions to good use. Wind can be one of the main sources of local power and not just a secondary source. -- Krzhizhanovskiy, director, Power Engineering Institute, Academy of Sciences USSR

PROBLEMS IN ELECTRIFICATION OF AGRICULTURE AIREED AT MEETING OF POWER ENGINEERS -- Tbilisi, Zarya Vostoka, 8 Oct 53

Electrification of socialist agriculture is an important integral part of a single plan for the electrification of the whole country.

The decree of the September Plenum of the Central Committee, CPSU, placed a number of new technical tasks before the rural electrifiers. To work out steps for accomplishing these tasks, the All-Union Scientific Society of Power Engineers and Technicians held a meeting in Tbilisi from 21 through 26 September 1953. Many representatives from scientific research organizations, schools, installations, and construction and administrative enterprises of the Sel'elektro system, as well as representatives of electrical equipment and machine building plants, attended the meeting. There were 240 delegates representing more than 20 cities in the Soviet Union at the meeting.

The meeting was devoted chiefly to questions connected with rapid fulfillment of the decisions of the September Plenum of the Central Committee.

The activities of scientific research institutes which are working on the creation of electrically operated machines for agriculture were subjected to sharp criticism. In numerous speeches members of the meeting observed that the tempo at which electric power is applied to agricultural processes and the work of scientific research institutes and of industry in creating electrically operated machines do not meet the requirements of the decree. So far, production of stationary agricultural machines driven by electric motors has not been organized, and no electrically operated machines for livestock farms, etc. have been devised. Electric power is not used sufficiently in the kolkhozes. For example, in the majority of electrified kolkhozes of the Georgian SSR, there are, as a rule, no more than two or three electric motors. It is thus far impossible to call one kolkhoz in the Georgian SSR fully electrified.

Wide application of electricity to agriculture must be carried out by electrifying groups of processes, related on the basis of power and technology, and not by electrifying isolated processes. Industry must provide electrically driven machines which operate as units.

Scientific research organizations and industry are confronted with formidable tasks in the construction of rural electric power lines to feed power from industrial power systems. Only extensive mechanization in the construction of electric power lines will ensure the necessary tempos of construction.

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Of great importance in making rural electric power construction rapid and cheap is the application of economical systems for distributing power, primarily the "two wires -- ground" system in which the ground serves as one on the conductors for the transmission of electricity. The Georgian SSR has had a wealth of experience in applying this system to electrification of agriculture.

An important problem facing industry at this time is the development of lighter high-voltage equipment for rural electric networks. The properties of existing types of wires must be improved quickly, and new types of wires, primarily steel-aluminum, must be created.

In the field of rural electric power stations the principal tasks, as before, are enlargement of capacities and synchronization of stations of different types within regional power systems.

USSR industry has organized production of wind-driven generators with a capacity of several tens of kilowatts. This capacity must be increased, and groups of wind-driven electric power stations operating in regional power systems along with electric power stations of other types must be created.

The meeting devoted much attention to the question of training personnel for rural electrification. The number of students in institutes and faculties which train electrical engineers for agriculture must be increased. The number of technicians and electric repairmen must also be increased and the level of their training raised.

#### RURAL ELECTRIFICATION IN THE UZBEK SSR -- Moscow, Pravda, 10 Oct 53

There are now 337 rural electric power stations, supplying 380 kolkhozes, in the Uzbek SSR. In addition, 41 kolkhozes receive electric current from the "Uzbekenergo" state network. This year, the amount of funds allocated for construction of rural electric power stations is twice as large as last year.

#### PLANS FOR RURAL ELECTRIFICATION IN KARELO-FINNISH SSR -- Petrozavodsk, Leninskoye Znamya, 3 Oct 53

Kolkhozes, sovkhoses, and MTS of the Karelo-Finnish SSR will be electrified by being connected to state, industrial, and municipal power systems. Over a 2½-year period, Karelo-Finnish agriculture will receive about 2,000 kilowatts of transformer capacity which will make it possible to electrify completely 48 kolkhozes, 17 sovkhoses, and 11 MTS of the republic.

Construction of rural state electric power stations and kolkhoz and inter-kolkhoz electric power stations, the total capacity of which will exceed 2,000 kilowatts, will also progress. At present, three rural hydroelectric power stations and four kolkhoz electric power stations are being built. Particular attention will be given to construction of kolkhoz electric power stations in kolkhozes which are remote from state power systems.

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